Implementing Low Impact Development in Salinas, CA

Workshop No. 2
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Chris Conway, Kennedy/Jenks Consultants

California Environmental Protection Agency
CENTRAL COAST REGIONAL
WATER QUALITY CONTROL BOARD

Presentation Outline

- Project Objectives and Schedule
- What is Low Impact Development (LID)?
- NPDES Permit Requirements
- Ordinance & Document Review
- Salinas Soils and Shallow Groundwater
- Tools for Selection of Treatment Controls & LID Practices
- Public Outreach and Education Process
- Questions & Next Steps

Salinas LID – Project Objectives

- Review City Codes and Ordinances for NPDES permit conformance
- Model LID Ordinance
- Development Standards Plan (DSP) with LID design guidance for Salinas
- DSP suitable for application to the entire Central Coast region's municipalities

Salinas LID – Project Schedule

- May 8: Project Kick-Off Meeting
- June 22: Workshop No. 1 – Regulatory Framework
- August 10: Workshop No. 2 – Review Codes, Ordinances & Documents
- September 28: Model LID Ordinance & Draft Development Standards Plan
- November 16: Final Development Standards Plan

What is LID?

- Drainage features and practices that mimic natural hydrologic functions to reduce the rate, volume and pollutant loading of urban runoff to pre-development conditions
- Hydrologically functional site design combined with pollution prevention measures to compensate for land development impacts on hydrology and water quality
- Decentralized stormwater micro-management techniques to mimic the original hydrologic regime

What is LID?

- Based on runoff volume control
- Low Impact Development (LID)
  Sustainable Urban Drainage Systems (SUDS)
  Natural Drainage Systems (NDS)
- Mimicking Nature
  - Interception
  - Initial abstraction
  - Infiltration
  - Evapotranspiration
  - Interflow
  - Overland flow
  - Groundwater Recharge

LID Site Planning Principles

- Think small (small storms, small drainage areas, small controls)
- Disconnect impervious surfaces
- Direct urban runoff to hydrologically functional landscapes
- Retain runoff with amended soils
- Evapotranspiration by vegetation
- Biodegradation of pollutants by soil bacteria
- Infiltration and groundwater recharge
- Control runoff volume at the source
- Design redundant systems

Impervious Surfaces

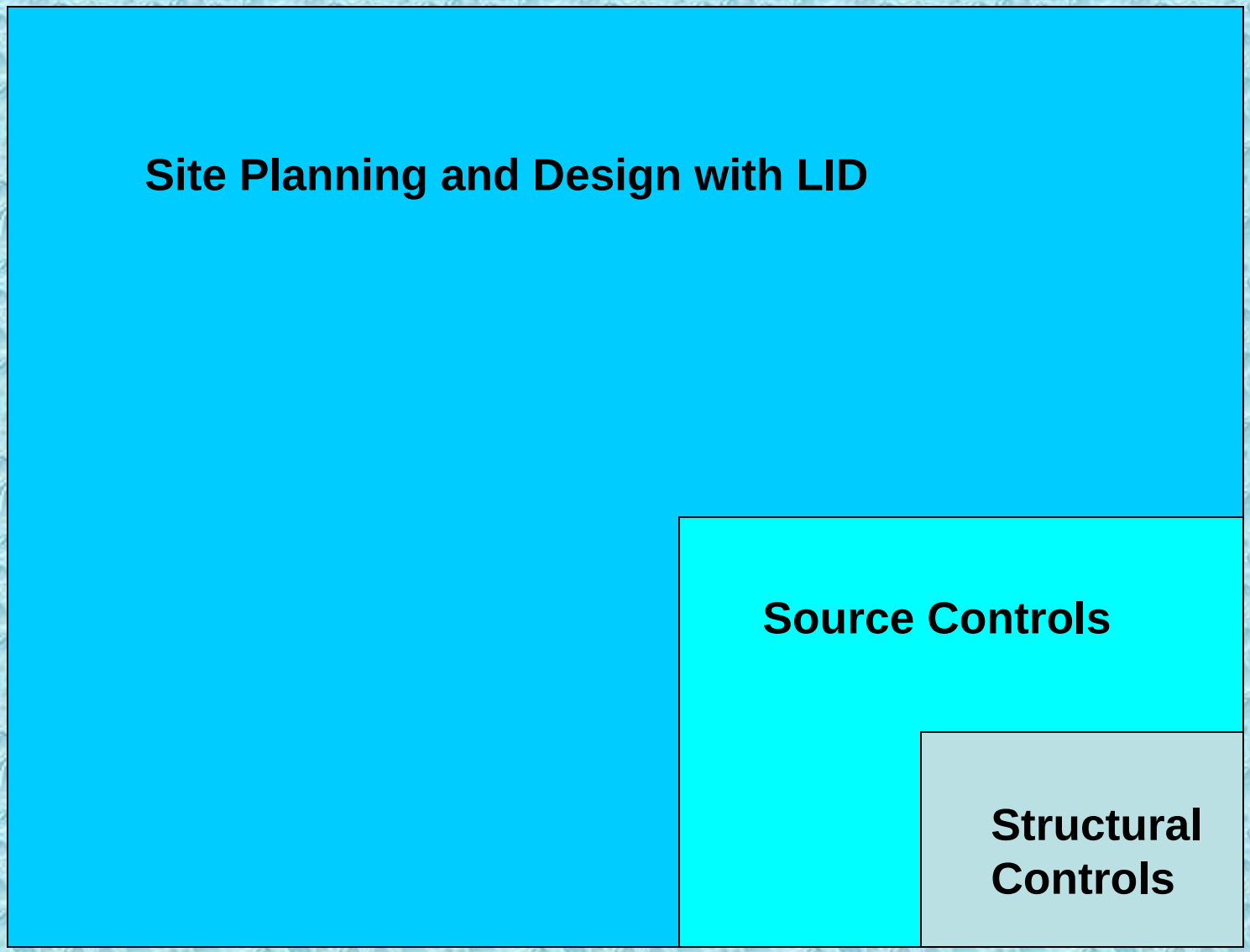
Materials such as concrete, asphalt, roofing, and compacted soil and conventional storm drainage:

- **Indicate intensive land uses that cause pollution**
- **Prevent infiltration of stormwater into the ground**
- **Prevent natural processing of pollutants by soils and plants**
- **Provide a surface for accumulation of pollutants**
- **Provide an express route for pollutants to waterways**
- **Increase downstream erosion and flooding**

Typical LID Practices

- Direct roof runoff to vegetated areas
- Swales with engineered soils and underdrains
- Landscape detention (bioretention)
- Curb cuts direct runoff to swales and bioretention basins
- Porous pavements
- Clustered Development
- Rain Barrels & Cisterns
- Green roofs

Relative Effectiveness of Methods to Reduce Runoff and Pollutant Loads



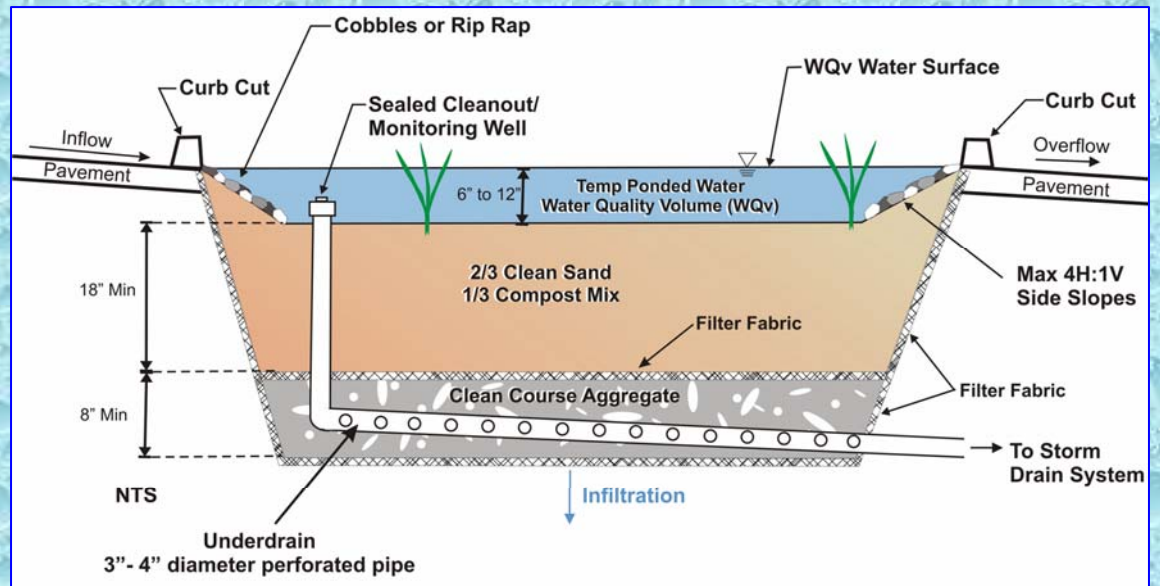
LID Site Design

Grassy Swales for Parking Lot Runoff

Swales incorporated into landscaping

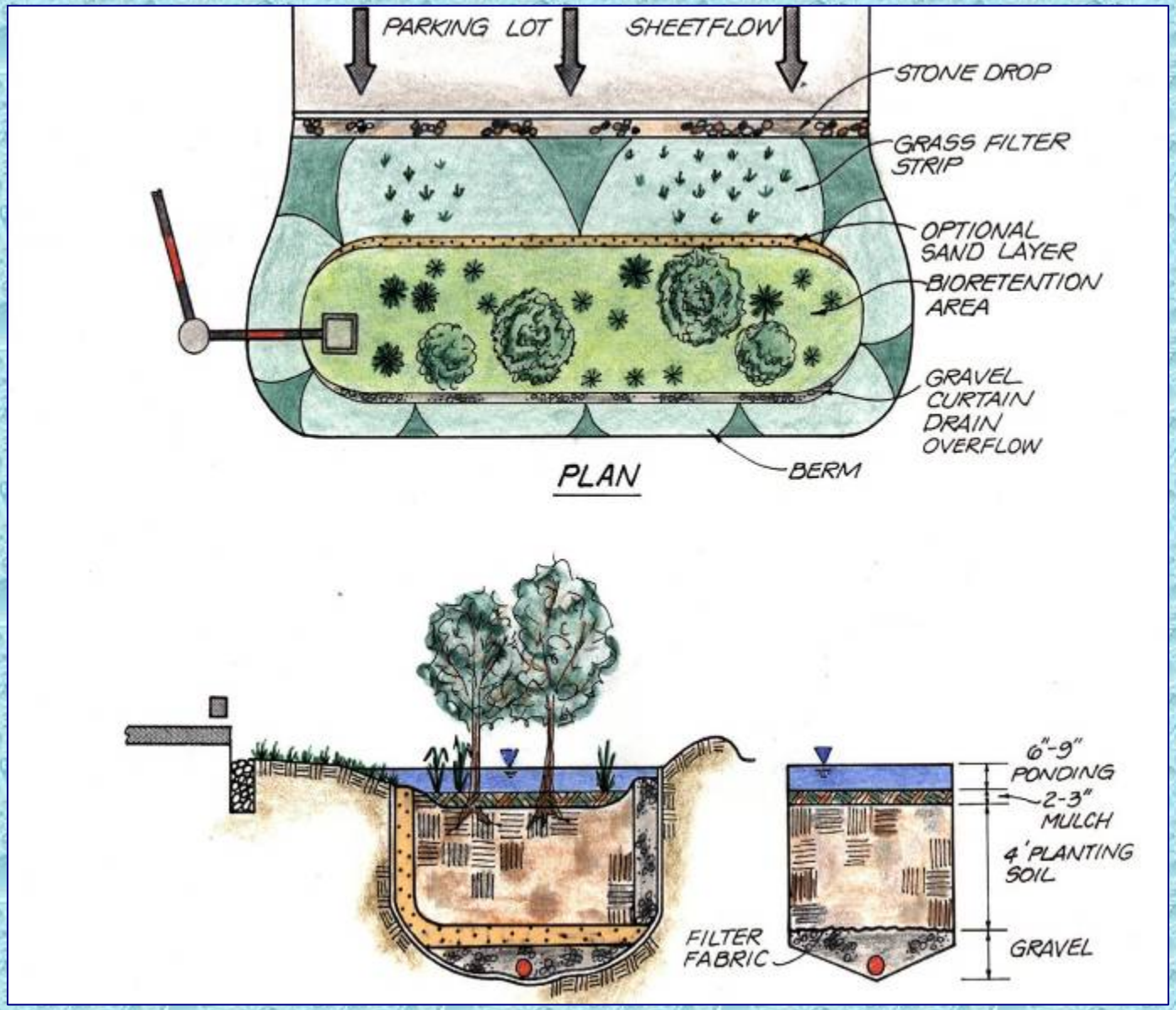
Runoff directed to vegetated areas

Bioretention for Parking Lot Runoff



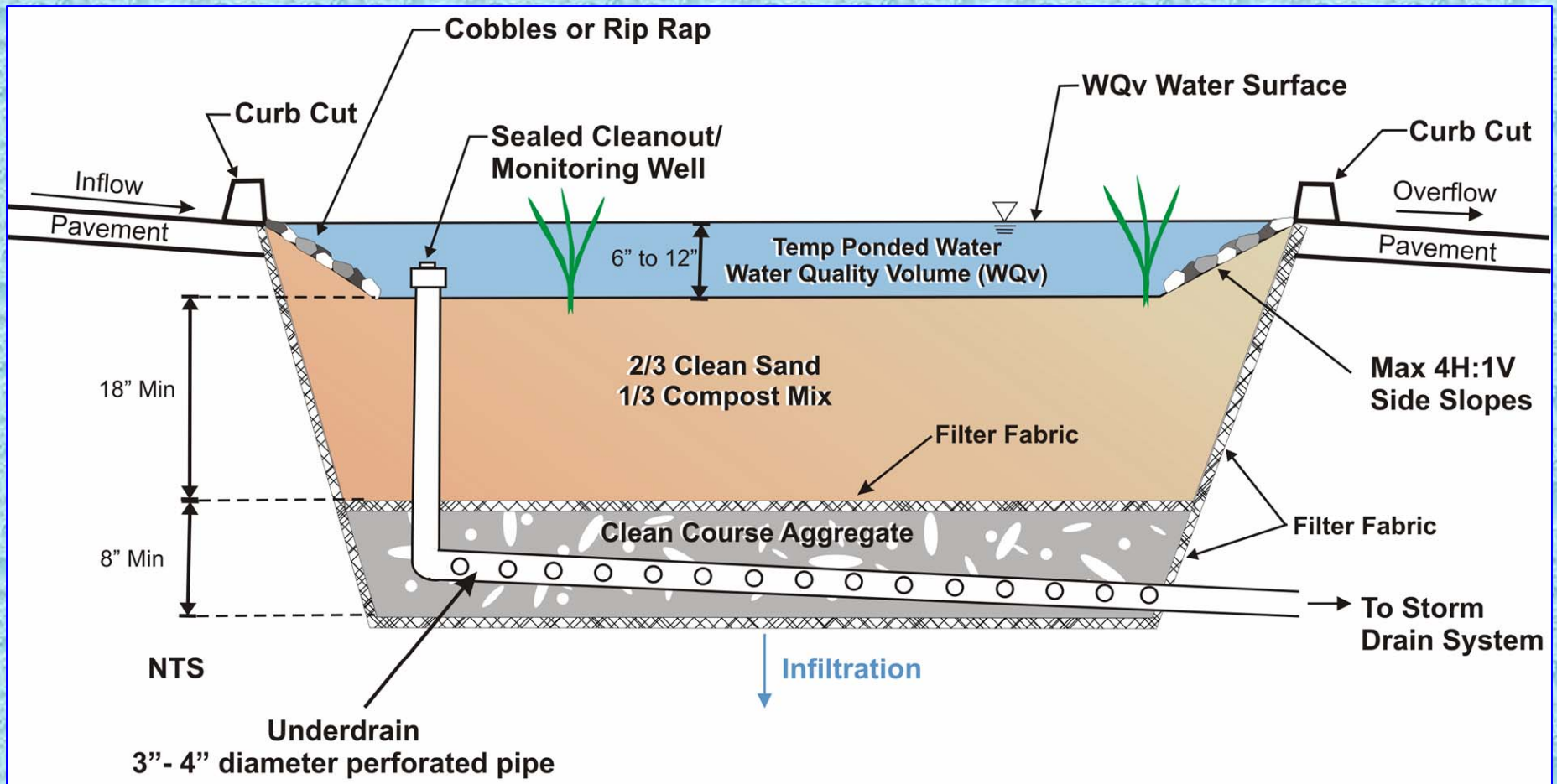
Scenario C: Poor to moderately drained soils (NCRS Type C or D) underdrain and permeable liner installed (minor infiltration), overflow to a valley gutter and the conventional storm drain system or a downstream treatment control.

Landscape Detention (Bioretention)



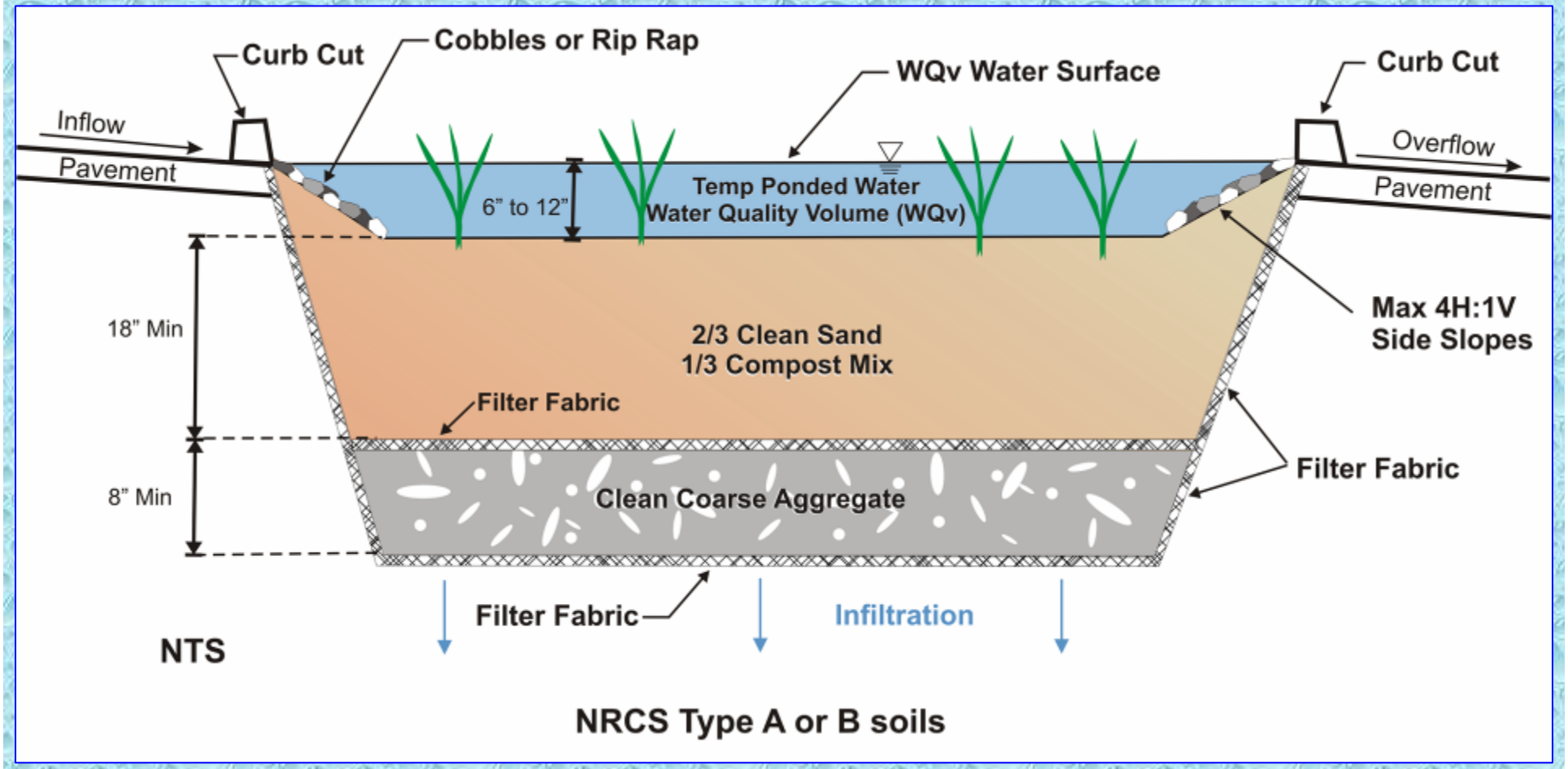
Source: Center for Watershed Protection

Landscape Detention (Bioretention)
With Underdrain System (minor infiltration)



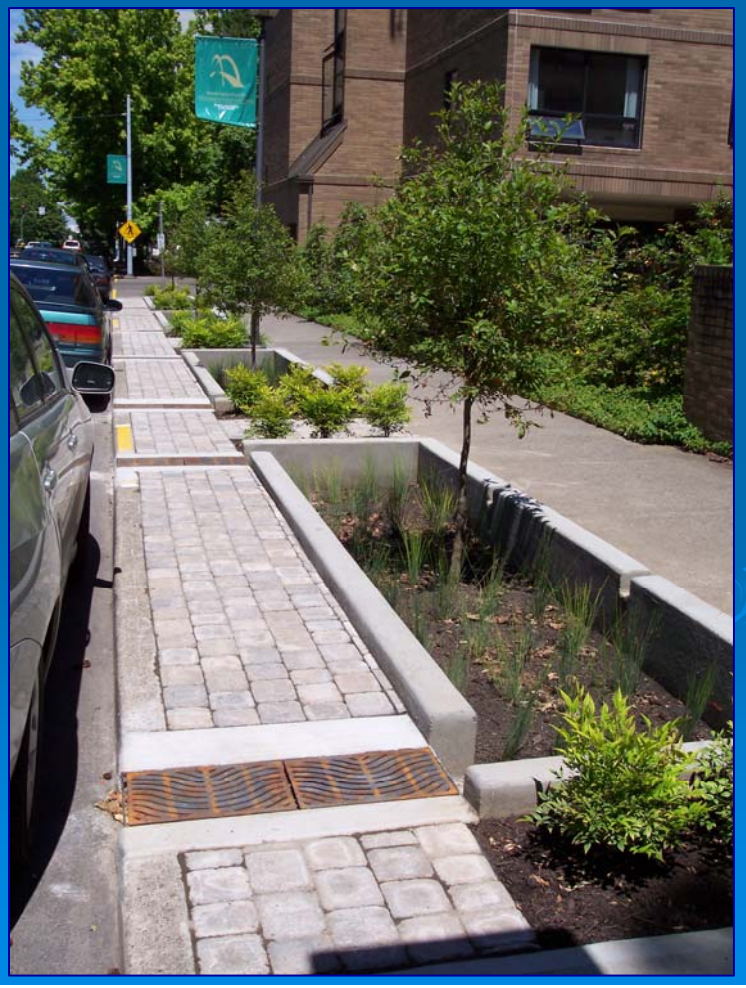
Scenario C: Poor to moderately drained soils (NCRS Type C or D) underdrain and permeable liner installed (minor infiltration), overflow to a valley gutter and the conventional storm drain system or a downstream treatment control.

Landscape Detention (Bioretention)
In Well Draining soils (0.5 to 2.4 in/hr)



Uses Physical, Chemical & Biological Processes to Reduce Pollutants

Bioretention for Street Runoff



Vegetated Bioretention Swales

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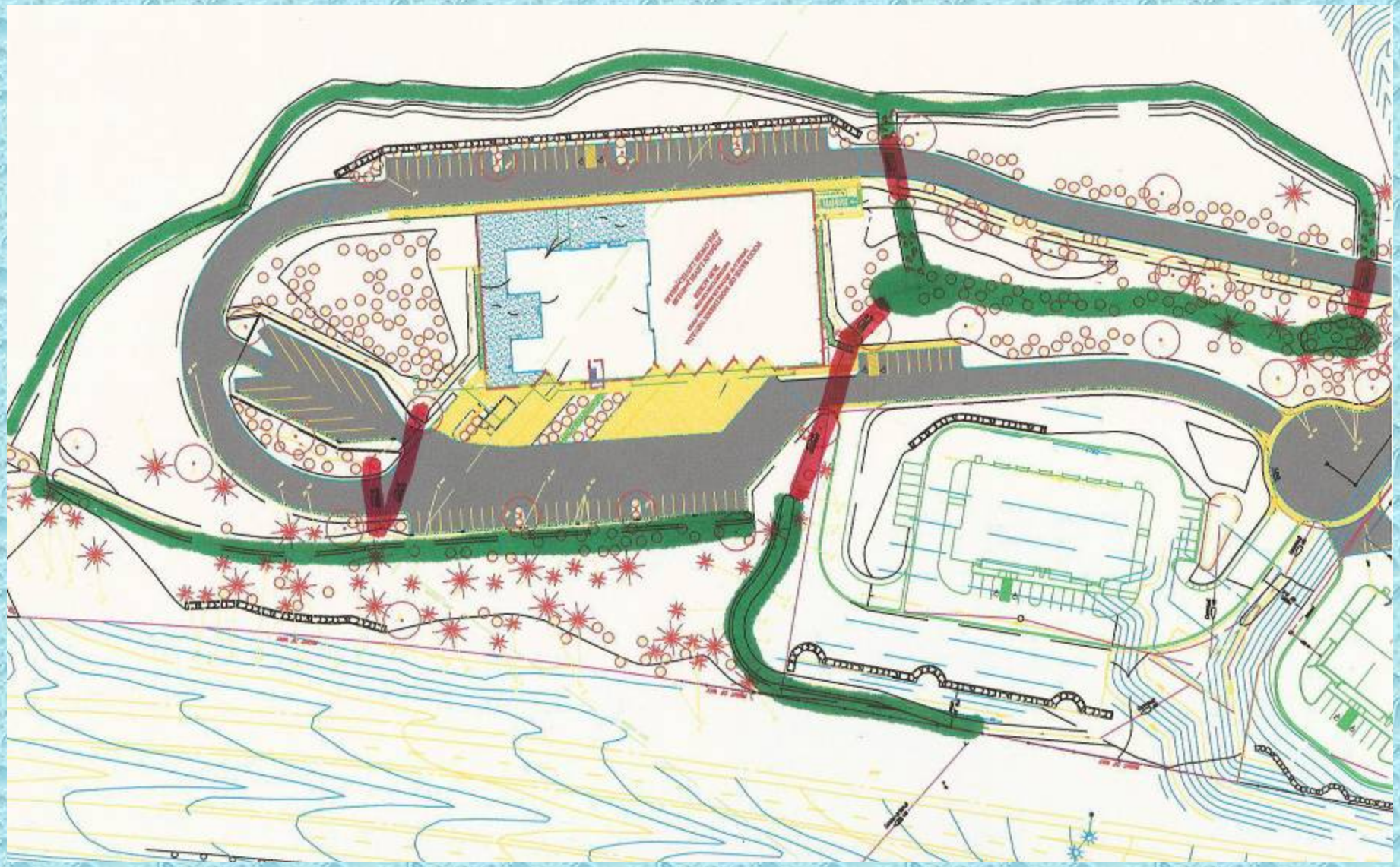
Porous Pavements

Parking Lot Improvements

Porous Pavements

Storm Drains vs. Bioswales



LID Costs

Cost Projections
for
Selected LID Practices

LID Practice	Permeability	Cost Range
Bioswales	Ideal (Moderate to Mod. Rapid = .5 to 2.5”/hr)	$8-12/LF
	Poor (Slow to Very Slow)	$11-15/LF
Rain Gardens/Retention Basins	Ideal (.5 to 2.5”/hr) -- With planting and irrigation	$1.^{50}-3/SF
	Poor -- Over-excavate & add appropriate soils	$2-4/SF
Vegetative Strips	Ideal -- Without irrigation	$0.^{35}-1/SF
	Poor -- With soil preparations & irrigation	$2-3/SF

Advantages of LID

- Better Space Utilization
- Preservation of Natural Assets
- Aesthetics
- Improved Public Safety
- Reduced O&M Cost
- Better Reliability
- “Green” Image
- Public Involvement

Benefits of LID in Salinas

- Runoff Limited to Pre-Development Conditions
- Non-Point Source Pollution Control
- Open Space Preservation
- Waterway Protection
- Water Conservation
- Groundwater Recharge
- Reduced Flooding
- Reduce Water Rights Entitlements
- NPDES Permit Compliance!